carbon dioxide required may be determined approximately by the following formula:

$$W = \frac{L \times B \times D}{36} \qquad (1)$$

where:

W=the weight of CO_2 required in pounds.
L=the length of the boiler room in feet.
B=the breadth of the boiler room in feet.
D=the distance in feet from tank top or flat forming lower boundary to top of boilers.

(b) When a carbon dioxide (CO_2) smothering system is fitted in the machinery space of a nautical school ship propelled by internal combustion engines, the quantity of carbon dioxide required may be determined approximately by the following formula:

$$W = \frac{L \times B \times D}{22} \qquad (2)$$

where:

W=the weight of CO_2 required in pounds.
L=the length of machinery space in feet.
B=breadth of the machinery space in feet.
D=distance in feet from tank top or flat forming lower boundary to the underside of deck forming the batch opening.

(c) The whole charge of gas shall be capable of being released simultaneously by operating one valve and control. All cylinders shall be completely discharged in not more than two minutes. The arrangement of the piping shall be such as to give a general and fairly uniform distribution over the entire area protected. An alarm which shall operate automatically with the operation of the system shall be provided to give a warning in the space when the carbon dioxide is about to be released. Provision shall be made to prevent the admission of air into the lower parts of the boiler or engine room while the system is in operation.

(d)(1) A lockout valve must be provided on any carbon dioxide extinguishing system protecting a space over 6,000 cubic feet in volume and installed or altered after July 9, 2013. ''Altered'' means modified or refurbished beyond the maintenance required by the manufacturer's design, installation, operation and maintenance manual.

(2) The lockout valve must be a manually operated valve located in the discharge manifold prior to the stop valve or selector valves. When in the closed position, the lockout valve must provide complete isolation of the system from the protected space or spaces, making it impossible for carbon dioxide to discharge in the event of equipment failure during maintenance.

(3) The lockout valve design or locking mechanism must make it obvious whether the valve is open or closed.

(4) A valve is considered a lockout valve if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it.

(5) The master or person-in-charge must ensure that the valve is locked open at all times, except while maintenance is being performed on the extinguishing system, when the valve must be locked in the closed position.

(6) Lockout valves added to existing systems must be approved by the Commandant as part of the installed system.

(e) Each carbon dioxide extinguishing system installed or altered after [July 9, 2013, must have an approved odorizing unit to produce the scent of wintergreen, the detection of which will serve as an indication that carbon dioxide gas is present in a protected area and any other area into which the carbon dioxide may migrate. ''Altered'' means modified or refurbished beyond the maintenance required by the manufacturer's design, installation, operation and maintenance manual.

[CGFR 51–11, 16 FR 3218, Apr. 12, 1951, as amended by USCG–2006–24797, 77 FR 33888, June 7, 2012]

§ 167.45–50 Foam smothering system requirements.

(a) When a foam-type system is fitted, its capacity shall be such as to rapidly discharge over the entire area of the bilge (tank top) of the largest boiler room a volume of foam 6 inches deep in not more than 3 minutes. The arrangement of piping shall be such as to give a uniform distribution over the entire area protected.

(b) The foam-type system may be of a type approved by the Navy or Coast Guard. All containers and valves by

which the system is operated shall be easily accessible and so placed that control valves and containers will not readily be cut off from use by an outbreak of fire.

§ 167.45–60 Emergency breathing apparatus and flame safety lamps.

Each nautical-school ship must be equipped with the following devices:

(a) Two pressure-demand, open circuit, self-contained breathing apparatus, approved by the Mine Safety and Health Administration (MSHA) and by the National Institute for Occupational Safety and Health (NIOSH) and having at a minimum a 30-minute air supply, a full face piece, and a spare charge for each. A self-contained compressed-air breathing apparatus previously approved under part 160, subpart 160.011, of this chapter may continue in use as required equipment if it was part of the vessel's equipment on November 23, 1992, and as long as it is maintained in good condition to the satisfaction of the Officer in Charge, Marine Inspection.

(b) One flame safety lamp approved by the Coast Guard or Navy.

[CGD 86–036, 57 FR 48326, Oct. 23, 1992, as amended by CGD 95–028, 62 FR 51217, Sept. 30, 1997]

§ 167.45–65 Portable fire extinguishers in accommodation spaces.

(a) All nautical school ships shall be provided with such number of good and efficient portable fire extinguishers approved by the Navy or Coast Guard as follows:

(1) Nautical school ships less than 150 feet in length shall have at least two fire extinguishers on each passenger deck.

(2) Nautical school ships 150 feet and over in length shall be provided with at least one fire extinguisher for every 150 linear feet of corridor length or fraction thereof in the spaces occupied by passengers and crew.

(3) In all public spaces fire extinguishers shall be located not more than 150 feet apart.

(b) The number of required fire extinguishers is based on the capacity of the ordinary fire extinguisher, which is about 2½ gallons, and no fire extinguisher of larger capacity shall be allowed a greater rating than that of the ordinary fire extinguisher. Fire extinguishers of approved types of less capacity are allowable when their total contents equal the required quantity.

§ 167.45–70 Portable fire extinguishers, general requirements.

(a) Extra charges shall be carried on board for 50 percent of each size and variety of fire extinguishers provided. If 50 percent of each size and variety of fire extinguishers carried gives a fractional result, extra charges shall be provided for the next largest whole number.

(1) The following is an example:

Fire extinguishers carried:	Extra charges required
1	1
2	1
3	2
4	2
5	3

(2) When the portable fire extinguisher is of such variety that it cannot be readily recharged by the vessel's personnel, one spare unit of the same classification shall be carried in lieu of spare charges for all such units of the same size and variety.

(b) Recharges, particularly the acid, used in charging soda-and-acid type of fire extinguishers, shall be packed in such manner that the filling operation (*i.e.*, in recharging the extinguisher) can be performed without subjecting the person doing the recharging to undue risk of acid burns and shall be contained in Crown stopper type of bottle.

(c) [Reserved]

(d) Fire extinguishers shall be located in such places as in the judgment of the Officer in Charge, Marine Inspection, will be most convenient and serviceable in case of emergency and so arranged that they may be easily removed from their fastenings.

(e) Every fire extinguisher provided shall be examined at each annual inspection to determine that it is still in good condition. Soda-and-acid and foam fire extinguishers shall be tested by discharging the contents, cleaning thoroughly, and then refilling. Carbon dioxide fire extinguishers shall be checked by weighing to determine contents and if found to be more than 10